

## ABSTRACT OF THE DISCLOSURE

A portable pathogen detection system that accomplishes on-site multiplex detection of targets in biological samples. The system includes: microbead specific reagents, incubation/mixing chambers, a disposable microbead capture substrate, and an optical measurement and decoding arrangement. The basis of this system is a highly flexible Liquid Array that utilizes optically encoded microbeads as the templates for biological assays. Target biological samples are optically labeled and captured on the microbeads, which are in turn captured on an ordered array or disordered array disposable capture substrate and then optically read.